INSECTS ASSOCIATED WITH THE FLOWERS OF *MARSDENIA CYMULOSA* BENTH. (ASCLEPIADACEAE) AND THEIR POSSIBLE ROLE IN POLLINATION

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Abstract

Insects associated with the flowers of *Marsdenia cymulosa* (Asclepiadaceae) at Weipa, Queensland are listed. Two flies *Sciara* sp. (Sciaridae) and *Apotropina bispinosa* (Becker) (Chloropidae) were found capable of effecting cross-pollination. *A. bispinosa* is newly recorded for Australia.

Introduction

Although many insects are capable of removing, transporting and inserting pollinaria in the strictly entomophilous plant family Asclepiadaceae, only some are effective at cross-fertilization with resultant seed production (Morse and Fritz 1983, Willmer 1988, Wyatt and Shannon 1986). Thus care should be exercised in attributing "pollinator" status to insects associated with asclepiad flowers (e.g. Pant *et al.* 1982).

There are approximately 90 species of Asclepiadaceae in Australia, and apart from *Metriorrhynchus lateralis* Redtenbacher (Coleoptera: Lycidae) pollinating *Marsdenia fraseri* Benth. (Forster 1989), *Ocybadistes walkeri sothis* Waterhouse (Lepidoptera: Hesperiidae) pollinating *Hoya australis* R.Br. ex Traill (Forster 1992) and *Anopheles farauti* Laveran (Diptera) carrying pollinaria that are probably those of *Gymnanthera nitida* R. Br. (Piper *et al.* 1990, Forster 1991), natural pollinators have not been recorded.

In this paper brief observations are given on insects associated with flowers of *Marsdenia cymulosa* Benth. at Weipa, and those considered capable of effecting cross-pollination are indicated.

Materials and Methods

Several copiously flowering plants of the liane *M. cymulosa* growing on the margins of evergreen notophyll vineforest at Lake Patricia, Weipa, Queensland (12°39'S 141°50'E) were studied between 1600 to 1630 h on 3 March 1990. Weather conditions during the day were clear to overcast with sporadic torrential downpours and showers due to the passage of a cyclone down the Gulf of Carpentaria. Humidity was high.

M. cymulosa has small campanulate flowers (2.4-3 mm long, 2.9-3 mm diameter) with the corolla tube unobstructed (entrance c. 1.5 mm diameter). The staminal column and a nectar source are at the corolla base. Flowers are present in umbelliform cymes with between 1 and 5 flowers open on a cyme at any one time. Pollinaria are small (c. 0.2 mm long and 0.34 mm wide) and just visible to the naked eye. Flowering occurs from December to April, and ripe fruits are present several months later.

Insects captured from open flowers by a hand-held aspirator were examined for pollinaria, in the field with a x10 lens and under a dissecting microscope.

Results

Five insect species were observed on the flowers.

Sciara sp. (Diptera: Sciaridae).

Apotropina bispinosa (Becker) (Diptera: Chloropidae).

Luciola sp. (Coleoptera: Lampyridae).

?*Melanterius* sp. (Coleoptera: Curculionidae).

Homoneura sp. (Diptera: Lauxaniidae).

All Diptera were 3 or 4 mm long and c. 1 mm broad. The beetles were at least 5 mm long and 2 mm broad.

The *Sciara* sp. and *A. bispinosa* were numerous (> 20 individuals) and had pollinaria present on the front legs and head. These minute flies were the most active of the insects, moving between individual flowers on the same cyme, between cymes and between flowers on different plants. Some individuals were observed to stroke the head with the front legs, seemingly attempting to dislodge pollinaria.

This is the first record of *A. bispinosa* for Australia, being previously known from New Guinea (J.W. Ismay, pers. comm. 1991).

Microscopic examination of flowers revealed that pollinaria were removed from some, pollinaria were inserted in some and dislodged pollinaria were caught in the various hairs in the corolla throat of others.

Discussion

Of the five insect species observed only the small flies were seen removing and inserting pollinaria. The beetles were too large to enter the flowers and are unlikely to dislodge pollinaria. Various Hymenoptera and Lepidoptera have been demonstrated to be highly efficient pollinators of asclepiads and are considered to be the primary pollinators (Morse and Fritz 1983). There is also considerable observational and qualitative evidence that Diptera are regular pollinators (Agnew 1976, Pant *et al.* 1982; Sabrosky 1987, Whittington 1989). The present observations support the role of Diptera as pollinators of asclepiads.

If small flies like those reported here, or insects of similar size as predicted by Kunze (1991), are common pollinators of asclepiads, it is possible that they are capable of entering quite complex flowers, eventually leaving and effecting cross-pollination. At yet the evidence is scanty, however small Diptera: Milichiidae have been reported from the complex, salverform flowers of *Ceropegia* (Sabrosky 1987). The present example serves to demonstrate that very small flies are capable of cross-pollinating small flowered asclepiads.

Major problems with determining the pollinators of asclepiads (and orchids for that matter) are observational opportunity and environmental suitability for the pollinator. I have collected a great many Asclepiadaceae in flower, yet have rarely sighted any insects that could be construed to be pollinating. Most plant collecting tends to be done when it is not too wet. At Weipa conditions were very damp and probably suitable for copious flowering of many plants and for the hatching and aggregation of many insects. Further observations are needed to determine whether asclepiad pollinators are more common at times generally unfavourable for human observation.

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